

Claims

[c1] What is claimed is:

1.A method for adjusting an image signal by a processor comprising:

(a)providing a first low pass filter and a second low pass filter;

(b)generating an energy ratio of a band-pass image signal and the image signal according to the standard deviation of afirst low pass signal of the first low pass filter and asecond low pass signal of the second low pass filter;

(c)providing an image adjustment parameter and generating a weighting coefficient of the image signal according to the energy ratio and the image adjustment parameter;

(d)generating a third low pass filter according to the weighting coefficient of the image signal, the image adjustment parameter, the first low pass signal of the first low pass filter, and the second low pass signal of the second low pass filter; and

(e)adjusting the image signal according to the image signal and the third low pass filter.

- [c2] 2.The method of claim 1 wherein in step (b), the band-pass image signal is generated by convoluting the image signal and a band-pass filter signal generated by subtracting the second low pass signal of the second low pass filter from the first low pass signal of the first low pass filter.
- [c3] 3.The method of claim 1 wherein in step (b), the band-pass image signal is generated by convoluting the image signal and the first low pass signal of the first low pass filter to generate a first signal, and convoluting the image signal and the second low pass signal of the second low pass filter to generate a second signal, and then subtracting the second signal from the first signal.
- [c4] 4.The method of claim 1 wherein in step (b), the standard deviation of the first low pass signal of the first low pass filter is not equivalent to the standard deviation of the second low pass signal of the second low pass filter.
- [c5]
- [c6] 5.The method of claim 4 wherein in step (b), the energy ratio of the band-pass image signal and the image signal is

$$\frac{1}{4\pi\sigma_1^2} - \frac{2}{2\pi(\sigma_1^2 + \sigma_2^2)} + \frac{1}{4\pi\sigma_2^2} \quad \text{,}$$

, wherein

$$\sigma_1$$

is the standard deviation of the first low pass signal of the first low pass filter, and

σ_2

is the standard deviation of the second low pass signal of the second low pass filter.

[c7] 6.The method of claim 1 wherein in step (c), the weighting coefficient of the image signal is $1-(\text{the image adjustment parameter}) \times (\text{the energy ratio of the band-pass image signal and the image signal})$.

[c8] 7.The method of claim 1 further comprising setting the range of the image adjustment parameter according to an acceptable range of the weighting coefficient of the image signal and the energy ratio of the band-pass im-

age signal and the image signal.

- [c9] 8.The method of claim 1 wherein step (d) further comprises generating a third low pass filter by multiplying the weighting coefficient of the image signal with a unit pulse signal

$$\delta(x, y)$$

plus the product of multiplying the image adjustment parameter with the remainder obtained by subtracting the second low pass signal of the second low pass filter from the first low pass signal of the first low pass filter.

- [c10] 9.The method of claim 1 wherein step (e) further comprises obtaining an adjusted image signal by multiplying the image signal with the third low pass filter.

- [c11] 10.An image processing system for implementing the method of claim 1.

- [c12] 11.A method for adjusting an image signal by a processor comprising:
- (a)providing a first low pass filter and a unit pulse signal;
 - (b)generating an energy ratio of a band-pass image signal and the image signal according to the standard deviation of afirst low pass signal of the first low pass filter;
 - (c)providing an image adjustment parameter and gener-

ating a weighting coefficient of the image signal according to the energy ratio and the image adjustment parameter;

(d)generating a third low pass filter according to the image signal, the image adjustment parameter, the first low pass signal of the first low pass filter, and the unit pulse signal;

(e)adjusting the image signal according to the image signal and the third low pass filter.

[c13] 12.The method of claim 11 wherein in step (b), the band-pass image signal is generated by convoluting the image signal and a band-pass filter signal generated by subtracting the first low pass signal of the first low pass filter from the unit pulse signal.

[c14] 13.The method of claim 11 wherein in step (b), the band-pass image signal is generated by convoluting the image signal and the unit pulse signal to generate a first signal, convoluting the image signal and the first low pass signal of the first low pass filter to generate a second signal, and then subtracting the second signal from the first signal.

[c15] 14.The method of claim 11 wherein in step (b), the standard deviation of the first low pass signal of the first low pass filter is larger than

$$\sqrt{\frac{3}{4\pi}}$$

.

[c16] 15.The method of claim 14 wherein in step (b), the energy ratio of the band-pass image signal and the image signal is

$$: 1-\frac{3}{4\pi\sigma_1^2}$$

, wherein

$$\sigma_1$$

is the standard deviation of the low pass signal of the first low pass filter.

[c17] 16.The method of claim 11 wherein in step (c), the weighting coefficient of the image signal is $1 - (\text{the image adjustment parameter}) * (\text{the energy ratio of the band-pass image signal and the image signal})$.

[c18] 17.The method of claim 11 further comprising setting the range of the image adjustment parameter according to an acceptable range of the weighting coefficient of the image signal and the energy ratio of the band-pass image signal and the image signal.

[c19] 18.The method of claim 11 wherein step (d) further comprises generating a third low pass filter by multiplying the weighting coefficient of the image signal with a unit pulse signal

$$\delta(x, y)$$

plus the product of multiplying the image adjustment parameter with the remainder obtained by subtracting the first low pass signal of the first low pass filter from the unit pulse signal.

[c20] 19.The method of claim 11 wherein step (e) further comprises obtaining an adjusted image signal by multiplying

the image signal with the third low pass filter.

[c21] 20. An image processing system for implementing the method of claim 11.